Blowing Hot and Cold on Project Management

Christophe N. Bredillet, *CASR 3PM, DAKAR, SENEGAL*

Abstract

The purpose of this article is to suggest a possible "meta" approach of the project management field—the unit of analysis—respectful of the various perspectives in existence, while providing an integrative ontological and epistemological framework. In order to do so, I first suggest what could be perceived as being the state of the field and its main constituting "school of thoughts." Then I open the debate on what could be the ontological and epistemological perspectives enabling us to better take into account the diversity we face in considering the richness of the field. Based on these developments, I propose to address project management as a complex integrative knowledge field, which eventually will lead us to consider "modeling—developing specific convention—to do ingeniously" as acting and learning mode in the management of projects.

KEYWORDS: integrative ontology; epistemology; school of thoughts; complexity; modeling; theory of convention; "ingenium"; project management

A and Ω (So Far . . .)

For the past 60 years, organizations have increasingly been using projects and programs to achieve their strategic objectives (Morris & Jamieson, 2004), while dealing with increasing complexity, uncertainty, and ambiguity affecting organizations and the socioeconomic environment within which they operate (Gareis, 2005). Through projects, resources and competencies are mobilized to bring about strategic change, and thereby create competitive advantage and other sources of value. Until the mid-1980s, interest in project management was limited to engineering, construction, defense, and information technology. More recently, interest has diversified into many other areas of management activity. Currently, more than 20% of global economic activity takes place as projects, and in some emerging economies it exceeds 30%. World Bank (2009) data indicate that 22% of the world's $48 trillion gross domestic product (GDP) is gross capital formation, which is almost entirely

project-based. In India it is 34%, and in China it is 45%. In many public and private organizations, some operating expenditures are also project-based. Project management makes an important and significant contribution to value creation globally.

Developing relevant competence at all levels—individual, team, organization, and society—is key to better performance (Gareis & Huemann, 2007). Educational programs in project management have grown rapidly during the last three decades to support the need for competence (Atkinson, 2006; Umpleby & Anbari, 2004). In the last three years, the Chinese Ministry of Education has supported the creation of 120 master's degree programs in project management to support their rapid economic development. To support this development, it is necessary for project management to develop as a rigorous academic field of study in management. This is essential so that the rapid economic development that is so dependent on project management can be underpinned by sound theory and not just case history of doubtful rigor.

Modern project management started as an offshoot of operations research, with the adoption of optimization tools developed in that field, and some members of the community have continued to present it as such. However, in this article, we wish to demonstrate that project management has now grown into a mature academic discipline of some diversity and complexity. At least nine schools of thought in project management can be identified, and project management is increasingly drawing on and making contributions to research in other fields of management, as I aim to demonstrate in this article. In this way, project management is becoming substantially different from operations management, which continues to emphasize the application of optimization tools to the analysis of production processes (Slack, Chambers, & Johnston, 2006).

Project Management as a Recognizable Field of Study?

Audet (1986) defines a knowledge field as:

> the space occupied by the whole of the people who claim to produce knowledge in this field, and this space is also a system of relationships between these people competing to gain control over the definition of the conditions and the rules of production of knowledge. (p. 42)

I use this definition to structure our discussion of project management as a knowledge field, while recognizing that other elements can be used to augment and enhance this definition based on other perspectives on how knowledge is gained in other fields (North, 1987), and different approaches to the classification of a knowledge field (Mintzberg, 1990), including empirical, rational, historic, and pragmatic methods (Hjørland, 1998).

With project management making such a significant contribution to the global economy, developing relevant competence at all levels—individual, team, organization, and society—is seen as a key for better performance (Gareis & Huemann, 2007). Knowledge is needed to develop competence (Crawford, 2007), and that knowledge should be based on sound, academically rigorous research.

The Users

In the early days of modern project management in the 1950s, the development of knowledge was led by the users. The U.S. military made significant early contributions to the new discipline, developing such concepts as the work-breakdown structure (WBS), the Cost and Schedule Control Systems Criteria (C/SCSC) (which evolved into earned value management, or EVM), and the Program Evaluation and Review Technique (PERT) (see Morris, 1997). Construction companies and their clients also made significant early contributions. For instance, DuPont developed the critical path method (CPM) from a technique devised in the field of operations research. The baton was picked up by the growing computer industry in the 1960s (see Brooks, 1995).

The Rise of Professional Associations and Agencies

In the 1980s, leadership of the development of knowledge was taken over by the professional associations: the Project Management Institute (PMI), based outside of Philadelphia, Pennsylvania, the United Kingdom's Association for Project Management (APM), the Australian Institute of Project Management (AIPM), and the International Project Management Association (IPMA). They needed to develop bodies of knowledge to support their certification programs. The focus of this work continued to be very user-oriented, and so did not always adhere to recognized standards of academic rigor.

Furthermore, looking at the network of relationships among recognized professional bodies and their methods of development (standards, certifications, research funding, SIGs), these organizations, through individualism and collaboration, exemplify Audet's definition. Examples of long-standing established professional bodies include PMI, IPMA, APM, and PMAJ (Project Management Association Japan);Examples of other well-established or newly established "professional" organizations include the APM Group, International Centre for Complex Project Management (ICCPM) (coming from the split in two of the former organizations), the College of Complex Project Managers (CCPM launched in November 2006), the Major Projects Association (MPA),; the Global Alliance for Project Performance Standards (GAPPS; launched in November 2006), and ISO TC 236 on Project Management. In addition, examples of industries, sectors, national and international agencies, and nongovernment organizations (NGOs), for example, include the IS/IT industry,

the construction industry, World Bank, United Nations, and defense, aerospace sectors (NASA, ESA, etc.).

And Then Came Academia

It is only over the last 10 to 15 years that universities and other academic research institutions have begun to provide leadership. The first academic research conference in project management, the biennial International Research Network for Organizing by Projects (IRNOP) conference, was initiated in 1994. PMI started holding its biennial research conference in 2000, and the annual European Academy of Management (EURAM) conference has had a project management track since its inception in 2001.

I could add to this the development of research networks (formal and informal), research (and practitioner) conferences, workshops and seminars, and the way they are interrelated and interactions through researchers, practitioners, and institutional relationships (professional bodies, various "professional" organizations, national and international research agencies, and academic organizations) in order to "produce knowledge." Examples of these include the PMI Research Community, IRNOP, EURAM, Academy of Management (AoM), and the European Institute for Advanced Studies in Management (EIASM), to mention a few.

So we see that project management is a relatively young field of study as an academic discipline. Initially, advanced study in project management in universities was located in schools of engineering or construction, and then in schools of computing. So it was viewed as a technical subject. More recently, project management has also been incorporated into schools of business or management, and so is now gaining recognition as a branch of management. To our knowledge, the first doctorates in the field were done in engineering and construction in the late 1960s at the University of Manchester, Faculty of technology (degrees conferred in 1971 and 1972) and the first doctorates in the field in schools of business in the United Kingdom were completed during the 1980s at Henley Management College and the Cranfield School of Management; and in France at SKEMA Business School (previously ESC Lille). Europe has led the way in the growth of project management as an academic subject in management. The first doctorate in the field in a school of business in the United States was done in the late 1980s at Drexel University, Department of Decision Sciences (degree conferred in 1993). At a recent meeting of a government-sponsored research network in the United Kingdom (Winter, Smith, Morris, & Cicmil, 2006), there were more researchers from business schools than schools of engineering, construction, and computing combined.

A Place of Evolution and Revolution

The evolution of bodies of knowledge is evidenced further by themes in papers and books, citing techniques to psycho-sociology of temporary groups through knowledge creation and organizational learning to strategic management. In addition, the field is currently characterized by this abundance of initiatives, updates, and development of standards at various levels (project, program, portfolio, maturity models, etc.) and in various areas (risks, contracts, WBS, scheduling, etc.), with an increasing use of project management methods and techniques at a strategic level.

This phase is the place of revolution, inaugurated by a growing, but still narrow subdivision within the project management community where the existing positivist paradigm has ceased to function adequately in the exploration of nature. The Engineering and Physical Sciences Research Council (EPRSC) Network in the United Kingdom "Rethinking Project Management" (2004–2006); PMI-funded research project "Impact of Complexity Theory on Project Management: Mapping the Field of Complexity Theory, and Using One Concept of Complexity as an Interpretive Framework in Studying Projects and Project Management Practice" (2005–2008); and the development of the College of Complex Project Managers (2006) exemplify this trend.

A second and more profound aspect upon which the significance of the first depends is that the success of revolution necessitates the full or partial relinquishment of one set of institutions in favor of another. For instance, considering the deployment of different certifications or credentials and of categories of standards and practices in various industries, geographic areas, and types of projects is quite interesting in this regard.

Has Anyone Found a Paradigm Out There?

At this stage, I can argue that the field is in a pre-paradigmatic phase according to Kuhn's sense (1970): there is no consensus on any particular theory, though the research being carried out can be considered scientific in nature. The current phase of development of the field is characterized by several incompatible and incomplete theories and perspectives (see, for instance, PMJ "Letter from the Editor"—from Vol *38*(2) to Vol *39*(3). If the actors in the pre-paradigm community eventually gravitate to one of these conceptual frameworks and ultimately to a widespread consensus on the appropriate choice of methods, terminology and what kind of experiment is likely to contribute to increased insights, then the phase of "normal science" begins.

But at the same time, considering for instance the "9 Schools of Project Management," the "Complexity," and the "Rethinking PM" research, I could argue that we are moving from an old paradigm—positivist—to a new one or to a more balanced one combining positivism, constructivism, and subjectivism,

enabling us to address complexity, uncertainty, and ambiguity, because the old one is not working anymore.

As a consequence, if the project management knowledge field exists and is in a pre-paradigmatic or paradigm-shift phase, it is not surprising.

The Quest for Theoretical Foundations

As a young discipline, the theoretical foundation of the field is still in its early stages of development. Meredith (2002) indicated that development of a theory of project management is important to progress in the field. Söderlund (2004) highlighted the wider interest in project management from other academic disciplines, the increasing need for discussing research on the subject, and the usefulness of examining project management and project organization from several perspectives. He discussed emerging perspectives within the field and presented questions that project research needs to discuss to further knowledge about project management. He argued that these questions include: why project organizations exist, how they behave and why they differ, what is the value added by the project management unit, and what determines the success or failure of project organizations. Turner (2006a, 2006b, 2006c, 2006d) outlined a theory of project management based on work he did in the early 1990s (see Turner, 2009, first edition published in 1993). Sauer and Reich (2007) agreed that such a theory was necessary as a basis for sound research on the subject but suggested that Turner's approach was very normative and that alternatives were possible. Cicmil, Williams, Thomas, and Hodgson (2006) suggested that to develop a sound theoretical basis for project management, the very nature of projects needs to be examined, and fundamental questions addressing the different underlying theoretical perspectives emerging from and supporting the project management field are yet to be explored. Walker, Cicmil, Thomas, Anbari, and Bredillet (2008) highlighted the value of reflective academic research to project management practitioners and suggested that a reflective learning approach to research can drive practical results through the commitment of academic and industry partners. Artto, Martinsuo, Gemünden, and Murtoaro (2009) conducted a comparative bibliometric study and showed that projects have product development as their dominant theory basis, whereas programs take an open system view, seek change in permanent organizations, and have organizational theories, strategy, product development, manufacturing, and change as their theoretical bases.

With the academic community now providing leadership to the development of knowledge in the field, greater academic rigor is being applied, meaning project management is now more deserving of recognition as an academic subject, and the admission of the *International Journal of Project Management* to the Social Sciences Citation Index (SSCI) is an important step in that process. Project management is drawing on other management disciplines and making contributions to them (Kwak & Anbari, 2008), and I believe that all fields of management will be richer for that growing

interchange. Against this background, several schools of project management thought have developed reflecting different trends, and the influence of other management disciplines.

This supports the need for various perspectives, as we have not yet any "grand unified theory"! A particular perspective, if valid in a specific area, cannot produce answers to every type of problem or in any type of situation. Furthermore, I argue that many applications of project management are done without questioning the deep nature of projects. What is project management in a given context, according to a specific perspective (ontological consideration)? On which epistemological foundations can we build the project management field? Which hypotheses apply to the field? What are the consequences on the development and use of theories, concepts, methods, and techniques?

I now suggest a structure of the field in nine major schools of thought.

Project Management Schools of Thought

We (my co-authors and co-researchers: Frank T. Anbari and J. Rodney Turner; see, for instance, PMJ Letter From The Editor Vol *38*(2) to Vol *39*(3); Anbari, Bredillet, & Turner, 2008) based our research on an extensive review of academic research literature on project management that reflects the evidence advanced by leading thinkers and research in the field. We organized the literature into nine major schools of thought on the basis of the key premise that drives each one. Our intent in separating these schools of thought is to gain insight into current and potential research, within a manageable number of research themes without oversimplification of the richness of the underlying thought.

The *Oxford English Dictionary* gives the following definition of the word "school," amongst several others, "School: a group of people sharing common ideas or methods; a specified style, approach or method; the imitators, disciples or followers of a philosopher, artist, etc."

That is what we mean by the word school: "A group of researchers investigating and developing common methods, tools and techniques (for practitioners to use), often with one or more lead researchers providing the vision in that area." We strongly believe that the word "school" reflects what we mean here.

Project management is a relatively young academic discipline, but with the help of other fields of management, it has quickly evolved into a field of some diversity and richness. It has been common to assume that projects and project management are fairly homogeneous (Association for Project Management, 2006; International Project Management Association, 2006; Project Management Institute, 2008). However, there is a growing belief that projects are different, their success can be judged in different ways, and they can require different competency profiles for their successful management (Crawford, Hobbs, & Turner, 2005, 2006; Shenhar & Dvir, 1996; Turner &

Müller, 2006). Building on prior work, we can recognize several perspectives of project management. Anbari (1985) identified five schools of thought. Söderlund (2002), through a literature search, and Bredillet (2004a), through a co-word analysis, each identified seven similar schools. We can now identify at least nine schools, and most research in project management can be said to fall into one of them.

Table 1 shows the nine schools and how they compare to the five schools of Anbari (1985) and the seven of Söderlund (2002) and Bredillet (2004a). In fact all nine schools were previously identified by the other three authors. Compared to Söderlund and Bredillet, we have added the Process School and split the Optimization School into the Optimization and Modeling Schools to reflect the modeling of multiple parameters and the use of soft-systems modeling. Anbari (1985) called the Process School the Systems School, and his Management Science School covered the Optimization, Modeling, and Decision Schools. He did not identify the Success or Marketing Schools. Table 1 also compares the nine schools to conventional fields of management study and to the management disciplines identified by Kwak and Anbari (2008) in their study of project management research published in top management and business journals.

Table 2 shows the key idea associated with each school and the metaphor we have adopted to reflect it.

The nine schools are depicted in Figure 1 in the order in which the school came to prominence.

Ontological and Epistemological Issues and Considerations

After Polanyi (1958), I propose an alternative ontological perspective both to Parmenidean “being” and Heraclitean “becoming” and an alternative epistemic position to positivism, constructivism, and subjectivism. I have no intention to separate personal judgment from scientific method. I argue that, especially in project management, knowledge creation and production have to integrate both classical scientific aspects and “fuzzy” or symbolic aspects.

“Ontological Argument” About the Existence of Project Management!

A “reality” can be explained according to a specific point of view or perspective and also can be considered as the symbol of higher order and a more general reality (for example, a two-dimensional form can be seen as the projection on a plan of an *n*-dimensional figure) (Guénon, 1986). I argue that

the “demiurgic” characteristic of project management involves seeing this field as an open space, without “having” (Have) but rather with a *raison d’être* (Be), because of the construction of Real by the projects. It could be considered to be a fundamental explanation of the pre-paradigmatic or paradigm-shift nature of this field (see Kuhn [1970] previously): the dominant paradigm, source of well-established theory(ies) is NOT to find. The deep nature of project management implies this paradox of being built on moving paradigms reflects the diversity of the creation process by itself.

This field is thus composed of both:

- *quantitative aspects* (Have—being ontology placing emphasis on permanent and unchanging reality), dependent upon the positivist and constructivism paradigms where reality is considered to exist independently of consciousness, or where meaning is constructed—not discovered—so subjects construct their own meaning in different ways but still address an objective reality “out there.” People have few degrees of freedom (operational research in network optimization, cost engineering, statistical methods, bodies of knowledge, application of standards, best practices, code of ethics, etc.—all of these are seen as being sort of “truth”) and
- *qualitative aspects* (Be—becoming ontology placing emphasis on change and emergence), dependent upon the subjectivist paradigm, where meaning is imposed on the object by the subject. People have thus many degrees of freedom (organizational design, learning, knowledge management, change management, systemic approaches, contextualization, and meta-rules).

Some of these aspects are linked together—for example, the creation and evolution of standards seen from the theory of convention (social construct and becoming “object”) and their application (positivism).

Thus, my vision for project management would be one of an integral function: the knowledge field is made up of differential elements, each of them being able to be defined (for example, cost control, scheduling, communication, quality, information system, temporary group, etc.). Seen as a whole, it is a transition to the limit, and in mathematics the result of an integral is quantitatively and qualitatively more than the sum of the parts.

From this point of view of the conceptual field of management of projects, it seems to me that there is

> inseparability of the knowledge and its representation understood in their distinctable activity, the intentional experience of the knowing subject and the groping construction of the subject representing knowledge, this undoubtedly constituting the strong assumption on which are defined teachable knowledge today, both scientific and ordinary (Le Moigne, 1995, p. 70). (See later the role of symbols in Theory of Convention.)

Epistemic Integration

So for me, project management as a knowledge field is both an art and a science, in their dialectic *and* integrative dimensions (close to the "critical-rationalist" and "interactionist" approach of Popper), and thus according to the three epistemological approaches:

- The positivist epistemology (materialist—quantitative—Have): "the relation of science to art may be summed up in a brief expression: from Science comes Prevision, from Prevision comes action" (Comte, 1855, p. 43).
- The constructivist epistemology (immaterialist—qualitative—Be-Have), with two hypotheses of reference as underlined by Le Moigne (1995):
    - The phenomenological hypothesis: the cognitive interaction, between the object or the phenomenon to be known and the subject knowing, forms at the same time the knowledge of the object (in "organizing the world") and the mode of development of knowledge by the subject (in "the intelligence organizing itself"). This hypothesis associates to the strict design knowledge (the cognizable reality is a phenomenological reality, which the subject experiments) an active conception: the knowledge the subject builds by its experience organizes simultaneously the method of construction of this knowledge, or his or her intelligence.
    - The teleological hypothesis: the intentionality or the finality of the knowing subject, according to its decisive role in the construction of knowledge (phenomenological hypothesis), must be taken into account.
- The subjectivist epistemology (immaterialist—qualitative—Be): If we follow Searle (1997), any value judgment is epistemically subjective. Thus, "McKinley is prettier than Everest" is epistemically subjective, whereas "McKinley is higher than Everest" is epistemically objective. In other words, the latter statement is evaluable (in fact, falsifiable) by an understood ("background") criterion for mountain height, like "the summit is so many meters above sea level." No such criteria exist for prettiness. Beyond this distinction, Searle thinks there are certain phenomena (including all conscious experiences) which are ontologically subjective, i.e. are experienced subjectively. For example, although it might be subjective or objective in the epistemic sense, a doctor's note that a patient suffers from back pain is an ontologically objective claim: it counts as a medical diagnosis only because the existence of back pain is "an objective fact of medical science" (Searle, 1997, p 122). But the pain itself is ontologically subjective: it is only experienced by the person having it.

Table 3 summarizes the development previously mentioned, linking ontological, epistemological, and some theoretical perspectives.

Coming back to the nine schools of thought introduced earlier in the article, we can emphasize the underlying ontological, epistemological, and theoretical perspectives for each of them.

Project Management as a Complex Integrative Field

My purpose is to provide in the following part theoretical insights into project management and to develop thoughts on an understanding of project management as a knowledge field and as a mirror (Bredillet, 2004b) used for action and reflection, actualizing creation of values (for people, organizations, and society). This is in the realm of complexity (Richardson, 2005), ambiguity, and uncertainty of interactions between multiple variables, each of them having a specific time horizon and occupying a specific place, playing a specific role and, where it is helpful, transposing one experience to other analogical contexts and situations (Gentner, 1983).

Our work is supported by complexity science and the theory of systems/systems science. Interestingly, they are reflective of the outcomes of research studies that call for new perspectives for project management (e.g,, Cooke-Davies, Cicmil, Crawford, & Richardson, 2007; Hodgson & Cicmil, 2006; Leybourne, 2007; Maylor, 2006; Williams, 2002).

I am constantly surprised by the way the world—that is, organizations, universities, professional bodies, practitioners, and students—sees project management: as a set of methods, techniques, tools, interacting with other fields—general management, engineering, construction, information systems, and the like—and bringing some effective ways of dealing with various sets of problems—from launching a new satellite to product development through to organizational change or new policy implementation. The problem is that most of the tools, techniques, and methods involve a conceptual approach based on a specific paradigm, which is mostly, in project management, a positivist one.

We need to question whether this is the appropriate paradigm for the kind of project management that claims to be able to deal with complex problems that do not have clear or straightforward solutions. The apparent lack of a theoretical foundation, the lack of a clear epistemological position in most of the research to date and the lack of a clear paradigm in most of the literature, seem, from my perspective, to be a real barrier to effective understanding and communication of the true nature of project management. This leads to nonsense, to a dynamic of fad, where hype and advocacy of one’s own practice is the rule, this being reinforced by a lack of critical thinking by the practitioners, who complacently accept seemingly reasonable answers, even if

they lead to major failures.It is often convenient and lucrative to reinforce accepted belief systems built on many centuries of thinking based on the positivist paradigm. Positivism has led in some cases to oversimplification—one problem equals one solution—and in many cases has obviated against recognition of the complexity and of the relativity of the world. The place of project management within most universities and as a research field shows that it is not yet considered as a discrete discipline. In most universities it is treated as a subdiscipline of construction, engineering, IT, or business faculties. At the same time it is claimed to be a trans-functional discipline. This situation itself contributes to a reinforcement of the positivist paradigm that pervades teaching, research, and practice of the discipline.

"Management". . .

Kurtz and Snowden (2003) question the three basic assumptions that pervade the practice and the theory of decision making and thus the translation of an organization's mission into practice: assumption of order, assumption of rational choice, and assumption of intentional capability:

- "The assumption of order: that there are underlying relationships between cause and effect in human interactions and markets, which are capable of discovery and empirical verification. In consequence, it is possible to produce prescriptive and predictive models and design interventions that allow us to achieve goals. This implies that an understanding of the causal links in past behavior allows us to define "best practice" for future behavior. It also implies that there must be a right or ideal way of doing things.
- The assumption of rational choice: that faced with a choice between one or more alternatives, human actors will make a "rational" decision based only on minimizing pain or maximizing pleasure; and, in consequence, their individual and collective behavior can be managed by manipulation of pain or pleasure outcomes and through education to make those consequences evident.
- The assumption of intentional capability: that the acquisition of capability indicates an intention to use that capability, and that actions from competitors, populations, nation states, communities, or whatever collective identity is under consideration are the result of intentional behavior. In effect, we assume that every "blink" we see is a "wink," and act accordingly. We accept that we do things by accident, but assume that others do things deliberately" (pp. 462–463).

A Need for Complexity. . .

I concur with Kurtz and Snowden and would argue that management of projects needs to be understood as a complex discipline because it aims to deal

with complex reality. In mathematics, since Ashby (1958) and the law of requisite variety, it is well known that to control a complex system with *n* dimensions, you need an *n* + 1 dimensional system. The available control variety must be equal to or greater than the disturbance variety for control to be possible. A number of conclusions can be derived from information theory, or from game theory; in a communications system, to transmit a message and receive it successfully, the coding/decoding variety must exceed the interference variety. In a game, the variety of moves you have available must be greater than the variety of moves available to your opponent if you are to be able to win. This implies that it is important to plan for many states (situations) and many misunderstandings (see the role of conventions that follow). As part of the key resulting concepts and principles, the following can be mentioned as very pertinent to the management of complex situations (programs and projects) topic:

- *The Conant-Ashby Theorem:* Every good regulator of a system must have a model of that system. *Implication:* The principle prompts you to think through and create a model of what you are teaching/managing/guiding.
- *The Darkness Principle:* Even though a system is never completely known, it can be managed effectively (black box theory)
- *The Redundancy of Resources Principle:* To minimize the effect of disturbances or noise, the system requires backup systems of critical resources (human and machine) in order to maintain stability. *Implications:* Plan actions before disturbance or noise happen, because they will.

. . . And Simplicity!

Management of projects also needs to be simple, as far as its principles are concerned (again, see the role of conventions that follow): like white light is transformed into multiple colors through a prism, management of projects applications may be seen as coming from some general principles.

Management of "What"? Scrutinizing the Concept of Project

From one perspective (Leroy, 1994), the concept of project is generally approached by listing its intrinsic characteristics. I have selected three definitions, chosen to demonstrate the range of different perspectives in the approaching of the project concept:

- "A project is a temporary endeavor undertaken to create a unique product or service or result" (PMI, 2008, p. 4), pointing out the instrumental perspective;

- "An endeavour in which human, material and financial resources are organised in a novel way, to undertake a unique scope of work, of given specification, within constraints of cost and time, so as to achieve beneficial change defined by quantitative and qualitative objectives" (Turner, 1993), putting forward the cognitive perspective; and
- "A project is a whole of actions limited in time and space, inserted in, and in interaction with a politico-socio-economic environment, aimed at and tended towards a goal progressively redefined by the dialectic between the thought (the project plan) and the reality" (Declerck, Debourse, & Navarre, 1983; Declerck, Debourse, & Declerck, 1997), illustrating the political perspective.

These different perspectives illustrate the polysemic nature of the concept of project (Boutinet, 1996). This polysemic nature is at the source of two underlying visions that have evolved with the development of project management.

On the one hand, it is interesting to note that the development of project management was accompanied by the constitution of codes of practice, and this is according to two plans:

1. The first is in the plan of the people, from the builders of cathedrals to the National Aeronautics and Space Administration (NASA) 100 rules of "the good" project manager, while passing by the processes of certification of the people. This is connected in the majority of the cases to an "initiation rite" (and rite comes from the Sanskrit *rita*, order), where theoretical knowledge is not enough, even if essential, but must be accompanied by recognition of the peers and of the practice.
2. The second is in the plan of the processes of management of the trajectory of the projects by the organizations, with the appearance of the standards, either with a descriptive or prescriptive feature. The underlying vision is a positivist one: experiences and practices lead to standards and rules, standards and rules lead to theories, and theories lead to paradigms.All of these, according to certain assumptions, are used as a basis of code of practices and bodies of knowledge

On the other hand, through projects, man builds reality, and as highlighted by authors like Declerck et al. (1997), the management of a project by its mode of deployment within the ecosystem project/firm/context implies a systemic vision, "an 'intelligent' action, 'ingenium,' this mental faculty which makes possible to connect in a fast, suitable and happy way the separate things" as stated by Le Moigne (1995), quoting Giambattista Vico (1708). Thus, the evolution noted in the use of project management and/or management by projects (Giard & Midler, 1993) and its structuring characteristics suggests a constructivist and a subjectivist vision.

Management of projects needs to integrate both quality (To Be) and quantity (To Have). Management of projects is a process of naming, of revelation, of creation. Thus, my purpose is to defend the proposition that management of project has a *raison d'être* in itself; it is, as previously mentioned, both a discipline and an art and is supported by the integrative ontological and epistemological position proposed, in which is the very nature of project management.

Tensions and Paradoxes in Project Management

This integrative perspective appears to be consubstantial with the concept of management of projects underlining the "tensions and paradoxes in the management of projects." Boutinet (1997) shows that the project model can constitute a suitable reference for the management of organizations. Through these tensions and paradoxes, it is possible to create and to innovate by using several parameters, which they organize in a paradoxical way. Not being conscious of this often involves a drift toward to a totalitarian or technicist project or toward simplification, the vulgarizing of projects brought back to our daily life. Current organizations in the mobility of our postindustrial culture resort readily to the figure of the project as a model of management (e.g., industrial companies, social or educational establishments, services, etc.). This recourse seems suitable, insofar as we move in complex and fluctuating environments that compel us to (1) create and innovate, while always resorting to a plurality of parameters; (2) to reason in terms of objectives, which is to be located from the unidimensional point of view that we knew; and (3) to reason in terms of projects, which is precisely this multidimensional thought made of a plurality of components to be taken into account. However those components, by the force of circumstances, often maintain the paradoxical relations between them. Indeed to speak about paradox is to move deliberately into a way of thinking that is uncommon, founded on a nontraditional logic, and that of unexpected "fuzzy" and uncertainty, in particular.

This way of thinking is completely congruent with our time of postmodernity marked by the advent of the postindustrial culture. We have now left the universe of certainty—the constants, determinisms, and laws—to enter that of fluidities and paradoxes. Doesn't the currently dominant reign of the communication networks represent an emergence, impossible to circumvent, of the plural oppositions that make us initially have a presentiment of an environment conditioned by the mode of its diversities and its contrasts? The project embodies completely this paradoxical reality since it exists only to disappear as soon as it is carried out! To speak about the nontraditional paradox of logic is to take a stand in opposition to traditional formal logic that has dominated until the end of the industrial age. This traditional logic was concerned with coherence and haunted by the principle of noncontradiction, discipline of the mind, and controlled sets of steps.This logic can, however,

twist the rational one in the direction of rationalizations, artificially giving to reality desired intelligibility. The increasing complexity of our environments means that the opportunities to use this traditional kind of logic are increasingly random; the relevance of the recourse to the paradox today is precisely related to the fact that it constitutes a suitable figure to think through the "fuzzyness," uncertainty, and even the strangeness of our intentions—that is, the heuristic framework of our projects.

These considerations on the different perspectives embodied in the concept of project management, on the polysemic nature of the concept, and consequentially on the underlying integrative perspective consubstantial to the concept of management of projects and its paradoxical and nontraditional logic, lead me to introduce the theoretical roots of the design of meta-models that is using "analogically situated experiences to create insight through novel contexts" (Houde, 2007, p. 321) for project management.

Most of these developments are the results of research undertaken as part of the Lille School of Management Research Centre—SKEMA Business School, and are grounded on the former works of the founders Declerck and Debourse (Declerck et al., 1983, 1997).

"Modeling to Understand" That Is to Do Ingeniously!

How to cope with these various complex management situations? Acting in complex situations involves "modeling to understand" that is to do ingeniously. (Le Moigne, 2003)

According to a complexity and systemic perspective acting and learning are inseparable. This involves having information, tacit or explicit knowledge, as well as understanding of the context, the different parameters and variables, their interaction and conditions of change. Thus, we can consider that there is a systemic and dynamic link between mission, management of program and project, information, knowledge, learning, and understanding in a given context and under given conditions.

This meta-modeling approach is well grounded in sound theoretical organizational frameworks. With a project management perspective, we can say the approach (also called meta-method) is about designing a contextual structure that:

- Provides a privileged place for individuals, project managers, and stakeholders to act and learn and such learning in project environment needs to integrate the two perspectives, as there is a need for a blend of creative or exploratory learning and application or exploitative learning (Boisot, 1998, p. 116). Having in mind the need

for efficiency and effectiveness, a project team acts as a temporary dissipative structure (Declercket al., 1997, p. 207), generating first entropy (that is knowledge) creating knowledge with many degrees of freedom, then applying it (entropy reduction by reduction of complexity, Boisot, 1998, p. 67–68) in the former stage of a project.

- Facilitates this praxis through a specific meta-method, one of the underlying paradigms being that there is a co-evolution between the subject/actor and his or her environment. This involves inseparability between the subject and the object in this observation-action process. This observation-action is related to an epistemo-praxeologic cognition through an observational chain (perception of what is true or wrong—epistemological subjectivity), a decision chain (decision made founded or unfounded—pragmatical subjectivity), and an effect chain (action fulfilled feasible or unfeasible – praxeological subjectivity). This epistemo-praxiologic cognition involves both partial subjectivity *and* partial objectivity, congruent with our previous alternative epistemological position.
- Enables to generate a specific convention (configuration of order) and some kind of stability to cope with uncertainty and ambiguity in a given project's complex situation. The meta-method helps to create a coherent or dissonant framework of symbols, promoting dynamic management practices which are creating adequate initial conditions for decision-making (and thus performance), and transparency (and thus accountability) while being conscious of rational voids.

It is worthwhile to write few words about the underlying theories in which is rooted any meta-modeling approach.

Meta-Modeling Roots

Two main theoretical areas, aligned with our epistemological position exposed earlier in this paper are considered here. This meta-modeling approach is grounded on "*N*-Learning" vs. "*S*-Learning" dialectic, and a praxeological epistemology.

N vs. S-Learning.

I am borrowing from Boisot (1998) a model grounded on an information perspective and complexity science, a set of theories describing how complex adaptive systems work. For Boisot (p. 34), knowledge assets emerge as a result of a two-step process, constituting the two distinct phases of the evolutionary production function: creating knowledge ("process of extracting information from data") and applying knowledge ("testing the insights created in a variety of situations that allow for the gradual accumulation of experiential data"). Boisot defines an information space (I-Space) according to three dimensions: codification (information codified/uncodified), abstraction (abstract/concrete),

and diffusion (diffused/undiffused). The creation and diffusion of new knowledge occurs in a particular sequence (Social Learning Cycle—SLC, p. 59): scanning, problem-solving, abstraction, diffusion, absorption, and impacting. Two distinct theories of learning, although not mutually exclusive, are introduced as part of identification of two distinct strategic orientations for dealing with the paradox of value (i.e. "*maximising the utility of knowledge assets compromises their scarcity, and maximising their scarcity make it difficult to develop and exploit their utility*", p. 90). In neoclassical learning (*N*-Learning) knowledge is considered cumulative. Learning becomes a stabilizing process. This approach may lead to excessive inertia and fossilization of the knowledge assets. In Schumpeterian learning (*S*-Learning), change is the natural order of things. Abstraction and codification are incomplete. "Knowledge may be progressive in the sense that successive approximation may give a better grasp of the underlying structures of reality, but it is not necessarily cumulative" (p. 99). *S*-Learning is more complex than *N*-Learning integrating both certainties and uncertainties, and requires an "edge of chaos" culture (p. 116).

Praxeological Epistemology.

One of the key understandings in project management is that learning and practice are integrated into a praxis – praxeological approach (see above the notion of "ingenium").

Praxeology is "The science of human action that strives for universally valid knowledge. In all of its branches this science is a priori, not empirical. Like logic and mathematics, it is not derived from experience; it is prior to experience. It is, as it were, the logic of action and deed." (Von Mises, 1976, Chapter 1 §6). Praxeology (early alteration of praxiology) is the study of human action and conduct. The name praxeologyakes its root in praxis, Medieval Latin, from Greek, doing, action, from prassein to do, practice (Merriam-Webster, 2003). The term praxeology was first used in 1890 by Espinas in "Les Origines de la technologie," Revue Philosophique, XVth year, XXX, p. 114–15. Praxeology is the study of those aspects of human action that can be grasped a priori; in other words, it is concerned with the conceptual analysis and logical implications of preference, choice, means-end schemes, and so forth. The basic principles of praxeology were first discovered by the Greek philosophers, who used them as a foundation for a eudaemonistic ethics. This approach was further developed by the Scholastics, who extended praxeological analysis to the foundations of economics and social science as well. In the late nineteenth century, the praxeological approach to economics and social science was rediscovered by Carl Menger, founder of the Austrian School (Menger, 1985). The term praxeology was first applied to this approach by the later Austrian economist Ludwig von Mises.

Along with his students (including Friedrich Hayek and Murray Rothbard), Mises employed praxeological principles to show that much existing economic and social theory was conceptually incoherent:

It is no longer possible to define neatly the boundaries between the kind of action which is the proper field of economic science in the narrower sense, and other action. Acting man is always concerned with both "material" and "ideal" things. He chooses between alternatives. . . .Choosing determines all human decisions. . . .Out of the political economy of the classical school emerges the general theory of human action, praxeology. . . .No treatment of economic problems proper can avoid starting from acts of choice; economics becomes a part, although the hitherto best elaborated part, of a more universal science, praxeology. Praxeology—and consequently economics too—is a deductive system. It draws its strength from the starting point of its deductions, from the category of action. Praxeology is a theoretical and systematic, not a historical, science. Its statements and propositions are not derived from experience. They are, like those of logic and mathematics, a priori. They are not subject to verification or falsification on the ground of experience and facts. (Von Mises, 1981)

Standard as a Convention: from "One Best Way" to "Ingenium"!

For the PMBOK® Guide (2008) definition: "a standard is a formal document that describes established norms, methods, processes, and practices."

As concluding remarks of this paper, I would like to give an alternate view of the principles and characteristics of what should be a standard in order to be congruent with the previous development and support the meta-modeling activity, heart of the creation of value(s) in complex project management.

I have introduced in a previous paper (Bredillet, 2002) an alternative view of standardization, mentioning the difficulties classical micro-economics poses in establishing a theory of standardization that is compatible with its fundamental axiomatic are underscored. I have proposed to reconsider the problem from the opposite perspective by questioning the theoretical base and by reformulating assumptions on the autonomy of the choice of the actors. The Theory of Convention offers us both a theoretical framework and tools, enabling us to understand the systemic dimension and dynamic structure of standards seen as a special case of conventions.

Gomez and Jones (2000) outline the main characteristics of the Theory of Convention: starting with the notions such as "deep structure" (Giddens, 1986; Gersick, 1991, Schein, 1980) and "system structure" (Crozier & Friedberg, 1980; Senge, 1990, 1994), they adopt "*this viewpoint that a state of "un-enlightenment represents neither a failure nor a consequence of cognitive limitations, but rather that it has a social function, and that it exists because it is essential for the smooth running of relationships in society*" (Gomez & Jones,

2000, p. 697). They argue that it could, indeed, constitute a referential notion, making compatible individual calculations and social context, and allowing for their co-construction and co-evolution (Schumpeter, 1989).

Three mains notions are discussed before they propose a definition of convention: uncertainty, "rationalization" and the process of justification of the behavior to cope with uncertainty, and rational voids (systems of non-justified beliefs). The rational void is "*surrounded by a screen of information which both provides individuals with signals that they share the same assumptions, and also distracts their attention from questioning it*" (Gomez & Jones, 2000, p. 700). These signals are said to operate also as symbols.

So, what is a convention? A convention is a social mechanism that associates a rational void, that is, a set of non-justified norms, with a screen of symbols, that is, an interrelation between objects, discourses, and behaviors. People acting according to a given convention refer to the same non=justified criteria and take for granted the symbolic meaning of signals they receive. Convention is an archetype or "structure" in Levi-Strauss' definition, that is to say, "a set of formal relationships among the elements in a symbolic system which can be modeled" (Levi-Strauss, 1971, 1974).

More formally, the concept of convention can be described as follows (Gomez, 1994, p. 95).

- A convention eliminates a situation of uncertainty where the result of a decision or an action for an agent would be indeterminate by individual calculation alone.
- A convention is an evolutionarily stable (Sugden, 1989) element of regularity. It provides a justifying set of norms (the rational void), which makes justification of some choices dispensable, but which gives them sense in the context of a screen of symbols, which relate objects, discourse, and behaviors to the same rational void.
- A convention is based on a shared belief. Five criteria, known as Lewis' conditions (Orlean, 1989; see also Lewis, 1969, p.42) are used to verify this: (1) There is general compliance with the convention. Those who comply are known as adopters. (2) All adopters anticipate that others will also comply (adopt). (3) Everyone prefers compliance with the convention to be general rather than less than general. (4) There could be at least one other alternative regular solution for the problem—the convention exists to solve. (5) These first four conditions are common knowledge.

From this, several important consequences can be drawn and discussed. Among the most important on which are based a meta-method seen as a "convention generator":

- "An individual always finds himself or herself within a conventional system of rationalization. An observed behavior is not always in relation to all symbols. It is situated in the screen of symbols, which means that it is linked with some others behaviors or objects but not

the totality of them. This notion of situation is crucial to understand the dynamics of conventions.

- Conventions are stable but not static patterns. Conventions evolve, modify themselves, and sometimes disappear.
- Within any convention, conformism allows individuals to escape the perils of uncertainty.
- Conventions are never completely isolated. If indeed an alternative provides a more coherent set of symbols, the individual can spontaneously escape ambiguity and potential uncertainty by behaving according to this one.
- The more numerous the symbolic signals received by an individual, the higher the probability of finding dissonant signals, and thus to be "attracted" by another convention. Learning plays an ambiguous role in this matter as even the organizational learning process (Argyris & Schön, 1978) can itself be either a new source of conformity and conservatism, when it leads to the recognition of only coherent symbolic signals, or a source of nonconformist behavior when it allows an increase in the number of signals that the individual perceives and the probability of encountering dissonance.
- No one individual can change a whole convention, but that everyone, by acting on it and within it locally, contributes to its evolution. This gives precision to the role and the limit of managerial action in organizations. Managers are not planners and decision makers applying a supposedly pure rationality, as they are always included in a social environment which gives both sense and limits to their rationality. They do not choose to act in one convention over another, but rather, as individuals, to escape the inhibiting effect of uncertainty. Once again, for any individual, the fact that the diversity of conventions allows some room for doubt and ambiguity is paradoxically the fact which gives them some freedom for action.
- Convention highlights in particular the important task of symbolic management. This allows us to better understand that management practices can also be a way of creating coherence, or creating gaps between the hidden and the visible, which leads to dissonance. Management has the subtle task of creating the conditions for routinization and, eventually, deroutinization. In practice, the use of a conventionalist framework leads us to understand organizational situations rather than organizations as an abstract and static whole" (Gomez & Jones, 2000, p. 701).

To Not Conclude . . . Ω and A

In order to tentatively generalize these findings, we suggest that recognition of 'complexity, ambiguity and uncertainty,' 'integrative epistemological approach,' modeling and its underlying bases (*N* vs. *S*-Learning, Praxeology), 'Acting, Knowing

and Learning.' and Theory of Convention seem to form a robust theoretical background to the development and content of any framework aimed at addressing the challenge of value creation in complex, ambiguous, and uncertain environments and situations.

Beyond any specific approach these theoretical bases may be seen as useful in supporting project (program/ portfolio) management frameworks contents, and in their contextual application. Finally, we suggest that organizations and professional bodies would get some benefits being more conscious of all the 'new' theoretical approaches and of the dynamic at stake in such framework development and design.

In so doing I hope to have contributed, however humbly, to a better perception and understanding of this fascinating field Be-Have! if not bee-hive. . .(Marx, 1965), to a better understanding of the project management field and demonstrated that it, as an integrative field—the place of the mirror between past and future, analysis and foresight, logic and paradigm—offers unique characteristics. The main one is probably to contribute to transform reality into ideality!

Ordo ab chaos

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Christophe N. Bredillet has 25 years of experience mainly in the fields of strategy, program & project management in bank, Sport goods, and IS/IT. For the past 17 years, he has been the Dean & Provost, Dean of the Postgraduate Programs, and Professor of Strategic Management & Program/Project Management at SKEMA Business School. He is the Editor of the *Project Management Journal.* He is a steering committee member of the Global Working Group Standards and steering committee member of the international non-aligned "think tank" group named OLCI. These roles and responsibilities involve academic & consulting work and faculty management on an international basis.

His main interests and research activities are in the field of portfolio/program/project management (principles and theories of portfolio/program/project management, knowledge management, bodies of knowledge, standards, use of system dynamics modeling to design life-long learning structure in portfolio/program/project management) and business dynamics (use of systems thinking and system dynamics in both portfolio/program/project and strategic management). These research activities are grounded on situational and praxeological approaches and on a constructivist and subjectivist points of view.

In both research and professional domains, he is strongly involved with professional project management associations (PMI®, IPMA, APM Group, ICCPM and PMAJ (Japan)). These commitments enable him to be strongly aware of portfolio/program/project management research and cutting edge professional practice.